

ART. VI.—*Sir William Thomson's Form of Daniell's Constant Battery.*

BY F. J. PIRANI, ESQ., M.A.

[Read 13th June, 1878.]

ART. VII.—*The Strength of Columns.*

BY W. C. KERNOT, M.A.

[Read 13th June, 1878.]

A COLUMN may be defined as a construction piece exposed to a compression in one direction and otherwise unstrained. Columns as thus defined are of constant occurrence in engineering and architectural structures. About 50 per cent. of the material in an ordinary roof or bridge truss consists of columns; the piston rod, connecting rod, and various other important parts of a steam-engine perform the functions of columns; and immense quantities of cast-iron are employed in the construction of warehouses, theatres, churches, and other buildings in the form of columns. The question of designing a column so as to secure sufficient strength at a minimum cost is therefore one of vast practical importance. Columns vary much in size, shape, and position, but, as a general rule, have one dimension considerably greater than either of the other two; in other words, they are comparatively long and slender pieces of material. Further, they are usually, though not always, straight. Bent columns, however, being of unfrequent occurrence, will not be discussed in this paper. A column is usually compressed in the direction of its length or greater dimension, and it is immaterial, so far as strength is concerned, whether this direction be vertical, horizontal, or inclined.

Columns are divided, according to their mode of fracture, into two great classes. The first of these contains those which fail by direct or simple crushing, unaccompanied by